

A vertical strip on the left side of the page shows a close-up, grayscale image of a printed circuit board (PCB) with various electronic components like chips, capacitors, and connectors.

AVR Professional Starter System

**Combined Serial and Parallel
Programming System for
Atmel AVR™ Microcontrollers
AVR2-ST**

GETTING STARTED

(Revision 1.03)



The Embedded Solutions Company

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Contacts

Equinox Technologies UK Limited

3 Atlas House, St Georges Square, Bolton, England BL1 2HB

Telephone Sales : **+44 (0) 1204 529000**

Fax : **+44 (0) 1204 535555**

E-mail : **sales@equinox-tech.com**

Web site : **www.equinox-tech.com**

For technical support on this product please e-mail us at:
avr2-st@equinox-tech.com

Software Updates

In line with our policy of continuous improvement, the software contained within this package is updated on a regular basis. If you would like to receive an automatic e-mail every time a new version is released, please make sure you have registered your system with Equinox and you have quoted your e-mail address. You may cancel this service at any time.

Software updates can currently be downloaded from the following places:

Internet : www.equinox-tech.com

ftp site : [ftp.equinox-tech.com](ftp://ftp.equinox-tech.com)

Atmel BBS : +1 408 436-4309

About AVR Microcontrollers

Atmel now manufacture a complete family of AVR microcontrollers each with differing FLASH, EEPROM, SRAM and number of I/O pins. Data sheets for these devices can be viewed and printed using the Actobat pdf reader software supplied on the Atmel CD-ROM. As data sheets are often updated on a regular basis, it is recommended that you consult the Atmel web site for the latest information.

A few sources of further information about Atmel AVR microcontrollers are listed below:

Atmel web site : www.atmel.com

Equinox web site : www.equinox-tech.com/avr.htm

If you have any silicon related technical support question about AVR microcontrollers which can not be answered by looking at the Atmel/Equinox web sites, please e-mail: avr@atmel.com with a detailed description of the problem.

Important - Please note

Equinox Technologies are unable to answer direct technical support questions concerning AVR microcontrollers. Please contact your local Atmel distributor or sales office if you require any further information.

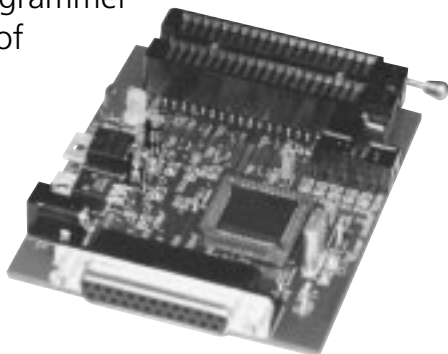
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Introduction

The “AVR™ Microcontroller Professional Starter System” has been designed as a low-cost entry tool into the Atmel AVR™ microcontroller arena. The system includes all the components required to get up and running with this new family of RISC microcontrollers including device programmer, evaluation module, AVR™ assembler, AVR™ BASIC Compiler (lite version) and a sample AT90S1200 microcontroller.

The ‘Activ8r’ programmer supplied with the system is capable of ‘fast parallel’ programming of the currently available 8-pin, 20-pin and 40-pin (DIL) AVR™ microcontrollers from Atmel in the ZIF socket. The programmer is also capable of in-system programming devices (in the user’s target board) by means of 10-way ribbon cable supplied.



The evaluation module supplied with the system, Evalu8r, supports most 8, 20 and 40-pin AVR microcontrollers. On board features include: LED’s, Switches, Sounder, RS-232 communications and an in-system programming port.

The system gives you the option of writing code in AVR™ assembler or AVR™ BASIC. The BASIC compiler produces fast efficient machine code for the AT90S1200 and can be used to complete full development projects for this device. An upgrade to an 8K code version is also available which supports the entire family up to the AT90S8515.

SYSTEM HIGHLIGHTS

- Supports programming of the Atmel 90S (AVR™) RISC microcontroller family
- Parallel and In-System Programming (ISP) modes supported
- Evaluation Module supplied provides LED’s, switches, serial communications etc
- Integrated Development Environment Including Editor, BASIC Compiler, Assembler & Prog
- Compatible with Windows 3.11™ *, Windows 95™ and Windows NT™

* Please Note:

AVR BASIC LITE **will not** operate under Windows 3.11™

System Specifications

Minimum System Contents

- Combined Serial & Parallel Device Programmer
- Microcontroller Evaluation Module
- AVR™ Basic Lite Compiler (NEW)
- One AT90S1200 DIL microcontroller
- Atmel Databook on CD ROM
- Power Supply Unit (PSU)
- ISP Ribbon Cable (to target)
- 9-way Serial Cable (to host PC)

Minimum PC Requirements

The minimum hardware and software requirements to ensure that the programmer operates correctly are as follows:

100% IBM compatible 386+

Windows 3.1 or higher *

Minimum 4MB RAM

Minimum 1MB free hard disk space

Spare PC serial port

* **Please Note:**

AVR BASIC LITE **will not** operate under Windows 3.11™

Activ8r Programmer Specifications

Programmer Size: 10.5 x 8 x 2 cm

Shipped Weight.....: approx 1.5kg

PSU: 15V DC @250mA

Port connection: Serial 9-way D-socket

ZIF socket: Quality 40way socket
Accepts both 0.3/0.6" pitch devices

ISP Target Voltage: +5V DC

ISP Header: 10-way IDC

Evalu8r Technical Specification

Power Input.....: a. +9 volts DC nominal (+25 volts Max)
b. +9v DC unregulated, or +5v DC regulated.

Power Connectors.: a. Standard 2.5mm ROKA type-centre positive. Accepts Equinox Power Supply
b. Screw Terminals to accept external bench PSU.
Pin 1 +5v
Pin 2 +9v
Pin 3 0v.

Serial Port: 3-wire asynchronous Communications interface, TxD, RxD, GND (RS-232 compatible).

Serial Connector: 9 way female D-type connector, PC compatible via. 1:1 cable
Pin 2 - TxD Output from Evalu8r
Pin 3 - RxD Input to Evalu8r
Pin 5 - GND Signal Ground connection

A/D Converter: Simple current source and comparator technique
GND Signal Ground
REF Voltage ramp from 65uA into 100nF approx.
AIN Input to Evalu8r. Max range 0v to +5v (clamped)
Noise filter built-in 10K/100nF approx.

Status Indication: Power-ON & PROG LED's.

Sounder.....: PIEZO type

Device profiles.....: 8, 20 and 40-pin devices are supported.
There is room to fit a 40-pin ZIF socket if required.

ISP Compatibility....: Equinox standard 10 -way Header

Other I/O.....: 5 switches and 8 LED's on 20/40 pin microcontroller port pins.

System Installation Overview

The AVR Professional Starter System is made up of both hardware and software components.

Hardware Components

- Activ8r Device Programmer
- Evalu8r Evaluation Module
- One AT90S1200 DIL microcontroller
- Power Supply Unit (PSU)
- ISP Ribbon Cable (to target)
- 9-way Serial Cable (to host PC)

Hardware Installation

- 1 Place the Activ8r programmer and Evalu8r evaluation module side by side on a flat surface.
- 2 Connect the 9-way serial cable between the Activ8r 9-way D connector and a spare PC COM port (9-way). If you only have 25-way on your connector then you will need a 25 to 9-way adaptor see attached products section.
- 3 Connect ISP cable between Activ8r and Evalu8r.
- 4 Check external power jumper settings (Should be set 1-2 and 3-4)
- 5 Plug power supply jack into power into power input of Activ8r and switch on the mains supply.

The 'Power' LED's on both the Activ8r and Evalu8r should illuminate.

Software Components

This system is supplied with two 3.5" floppy discs containing various software utilities:

Disk 1:

"AVR Professional Starter System (AVR2-ST)"

- Meridian for Windows - Programmer Interface Software
- AVR BASIC Lite

Disk 2:

"Atmel AT90S Family - Assembler & Simulator"

- Atmel AVR Assembler
- Atmel AVR Simulator

Software Installation

Insert Disk 1

"AVR Professional Starter System (AVR2-ST)"

- Log onto the disk --> Meridian & AVR basic setup icons should be displayed
- Launch the Meridian.exe install program and follow all on-screen instructions
- Launch the AVRbasic.exe install program and follow all on-screen instructions

'Meridian for Windows' and 'AVR BASIC Lite' have now been installed.

Insert Disk 2

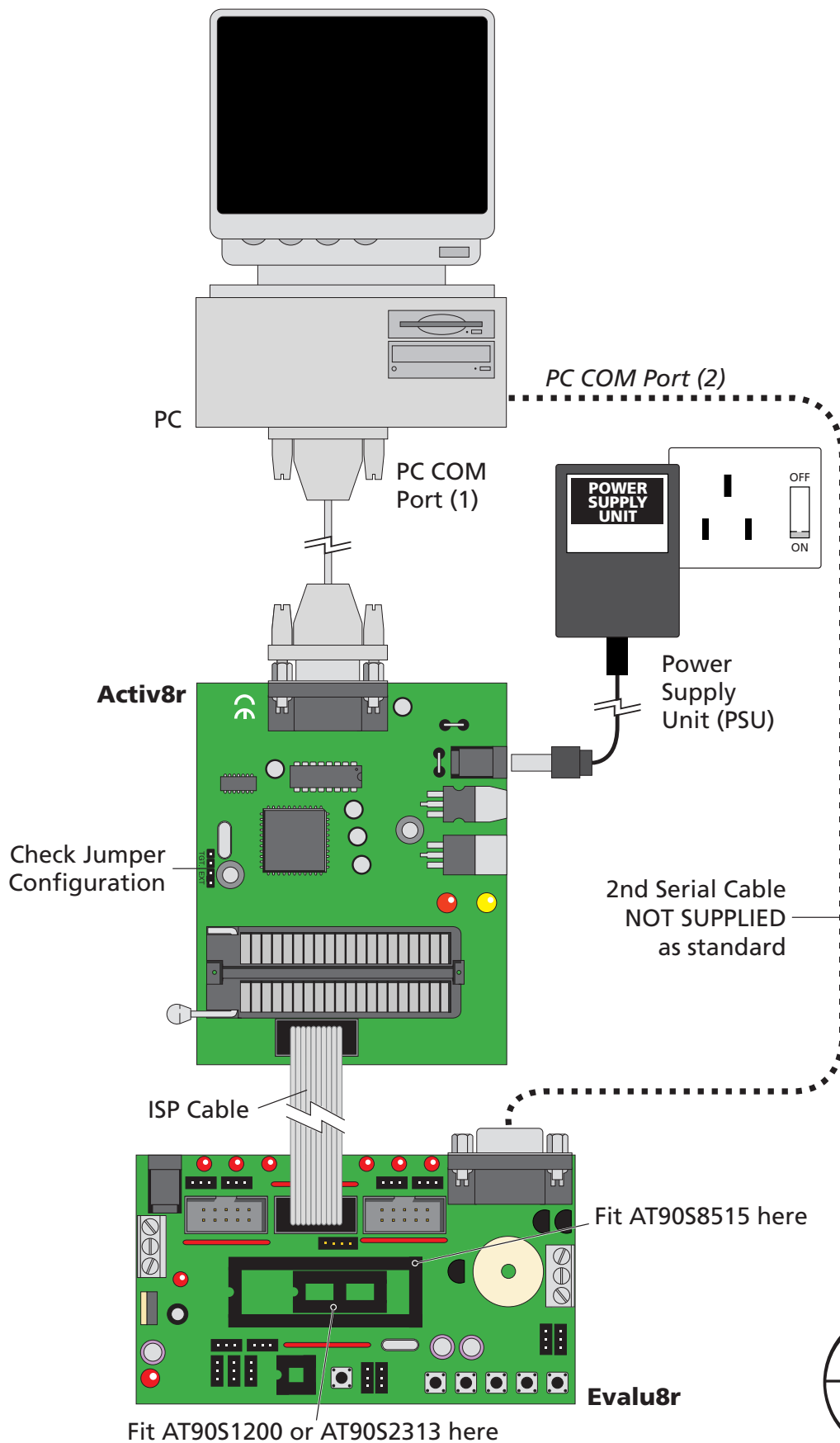
"Atmel AT90S Family - Assembler & Simulator"

- Log onto the disk --> setup.exe should be displayed
- Launch the setup.exe install program and follow all on-screen instructions

The Assembler and Simulator applications have now been installed.

Software installation is now complete.

System Installation Overview Continued



Device Support

It is possible to program Atmel AVR™ microcontroller devices using two different methods:

1 Parallel Programming Mode (ZIF)

In this mode the target device must be placed in the programmer ZIF socket. It is possible to set certain 'Special Option' fuses in this mode which can not be altered in ISP mode.

2 Serial In-System Programming (ISP) Mode

This mode allows a device in a remote target system to be programmed without removing the device from the board. A special ISP cable is supplied with the programmer which plugs into the user target system.

The table below shows the AVR microcontrollers which this system supports and also details whether a particular device is supported by the assembler and 'BASIC LITE'.

ATMEL AVR (90S) FLASH MICROCONTROLLER SUPPORT

90S (AVR)	Parallel (ZIF)	In-System (ISP)	Assembler	BASIC Lite
AT90S1200	YES	YES	YES	YES
AT90S1200A	YES	YES	YES	YES
AT90S2313	YES	YES	YES	NO
AT90S2323	YES	YES	YES	NO
AT90S2343	YES	YES	YES	NO
AT90S4414	YES	YES	YES	NO
AT90S8515	YES	YES	YES	NO

The following device families are not supported by this system:

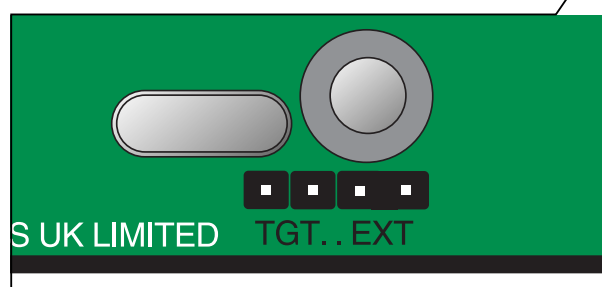
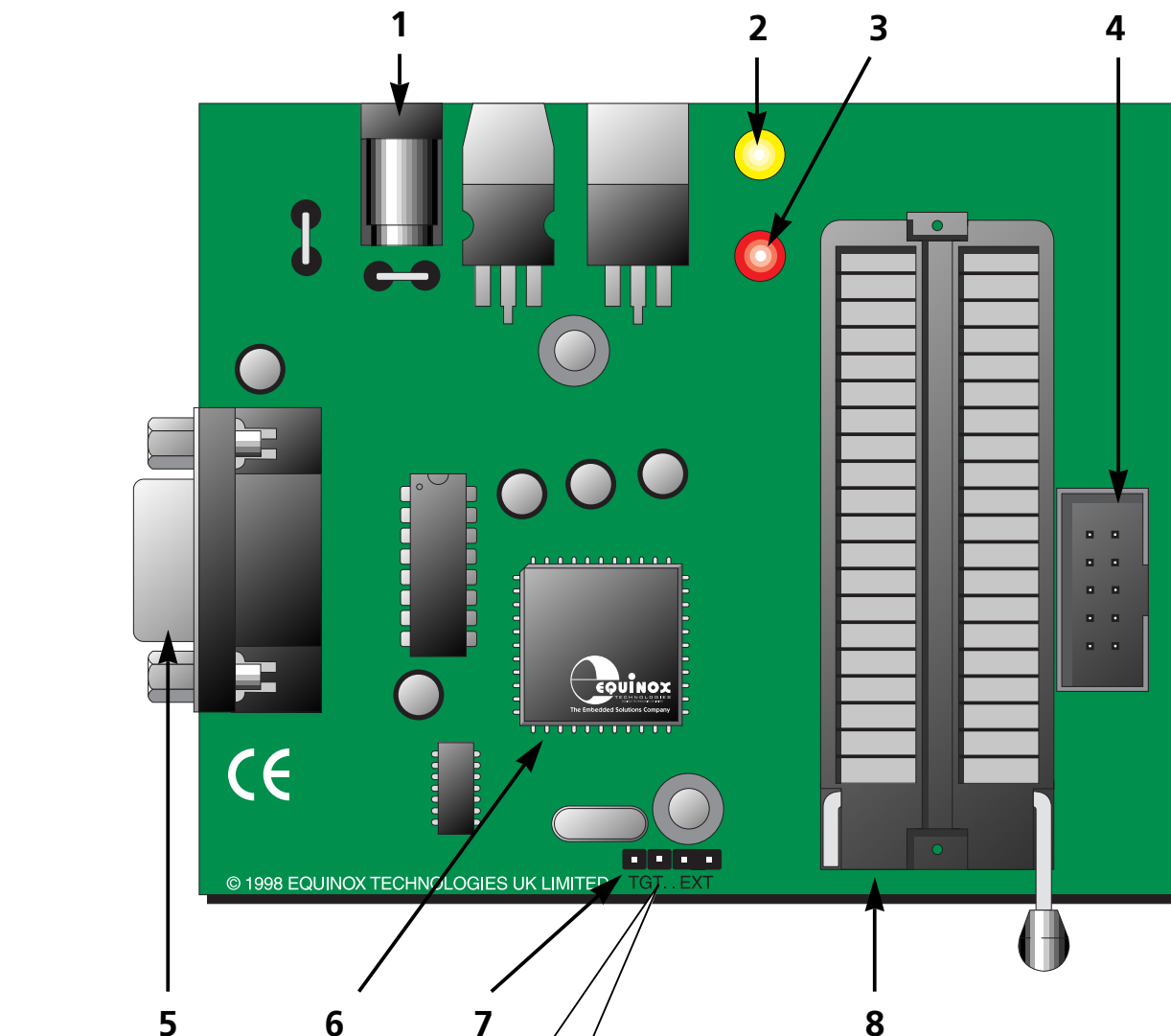
Atmel Mega AVR Microcontrollers & Atmel 89S Microcontrollers

Please note:

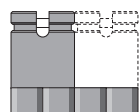
The Activ8r programmer is able to program all AVR devices on the market as of late 1997. In order to achieve this, certain hardware resources are dedicated to particular pins on the ZIF socket. Should Atmel release any devices in future which require different resources, programming of these in the ZIF socket may not be guaranteed. Although Equinox may opt to extend device support for the Activ8r, we are not obliged to do so. We may offer support for future devices on products as yet unannounced.

Whilst every care has been taken in the design and manufacture of this product, software and support literature, the company will not be held liable for any loss or damages, including but not limited to consequential losses, which might arise out of its use.

Activ8r Hardware Overview

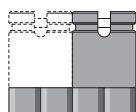


TGT



Fit jumper here to power Activ8r from target's Vcc

EXT

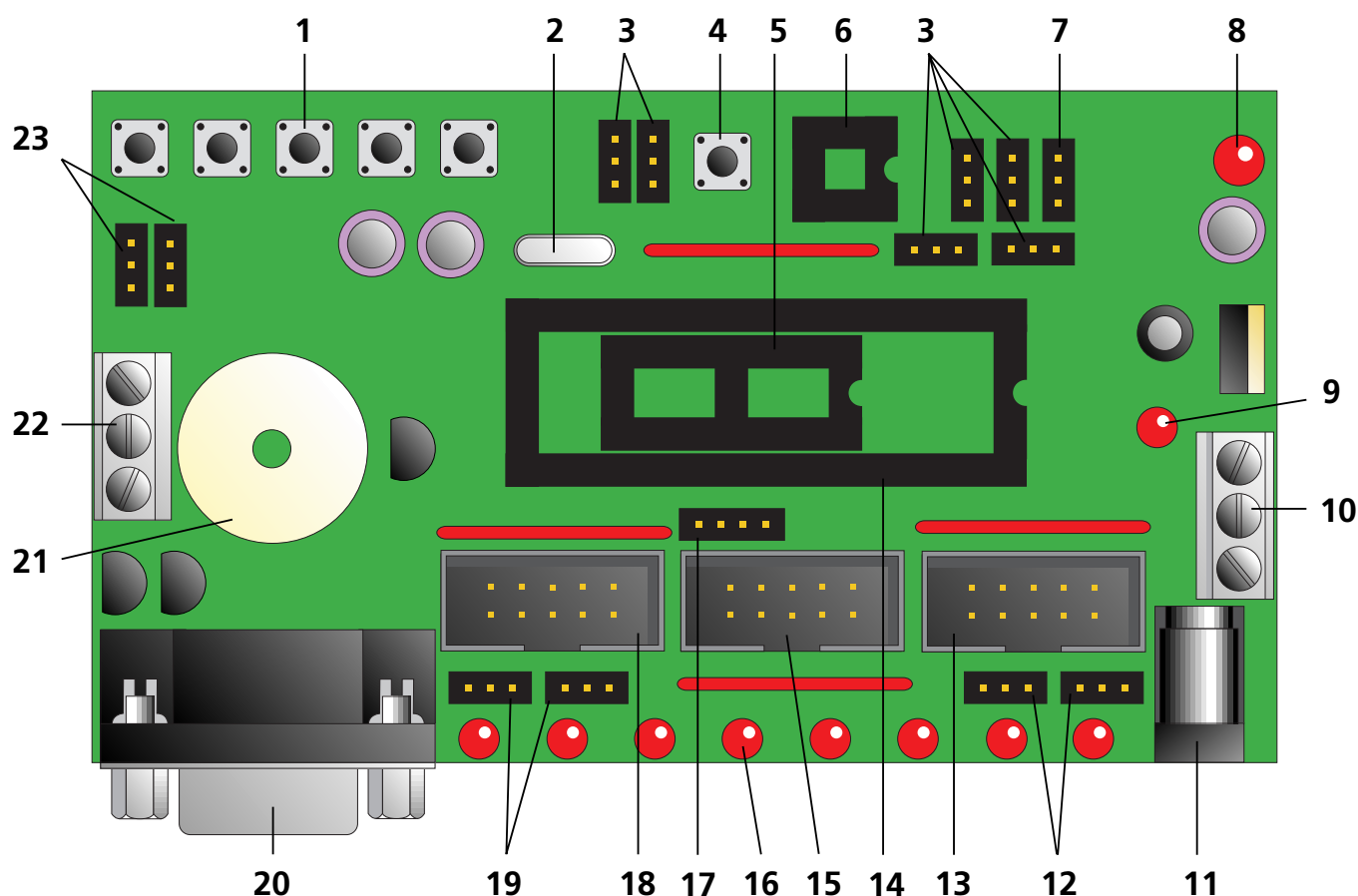


Fit jumper here to power Activ8r from Equinox PSU

Key

- 1** PSU input
- 2** Active LED (Yellow)
- 3** Power LED (Red)
- 4** ISP Connector (10-way IDC Header Socket)
- 5** Serial Cable Connection to PC
- 6** Controller Chip
- 7** Power Configuration Jumpers
- 8** ZIF (Zero Insertion Force) socket (40-way)

Evalu8r Hardware Overview



KEY:

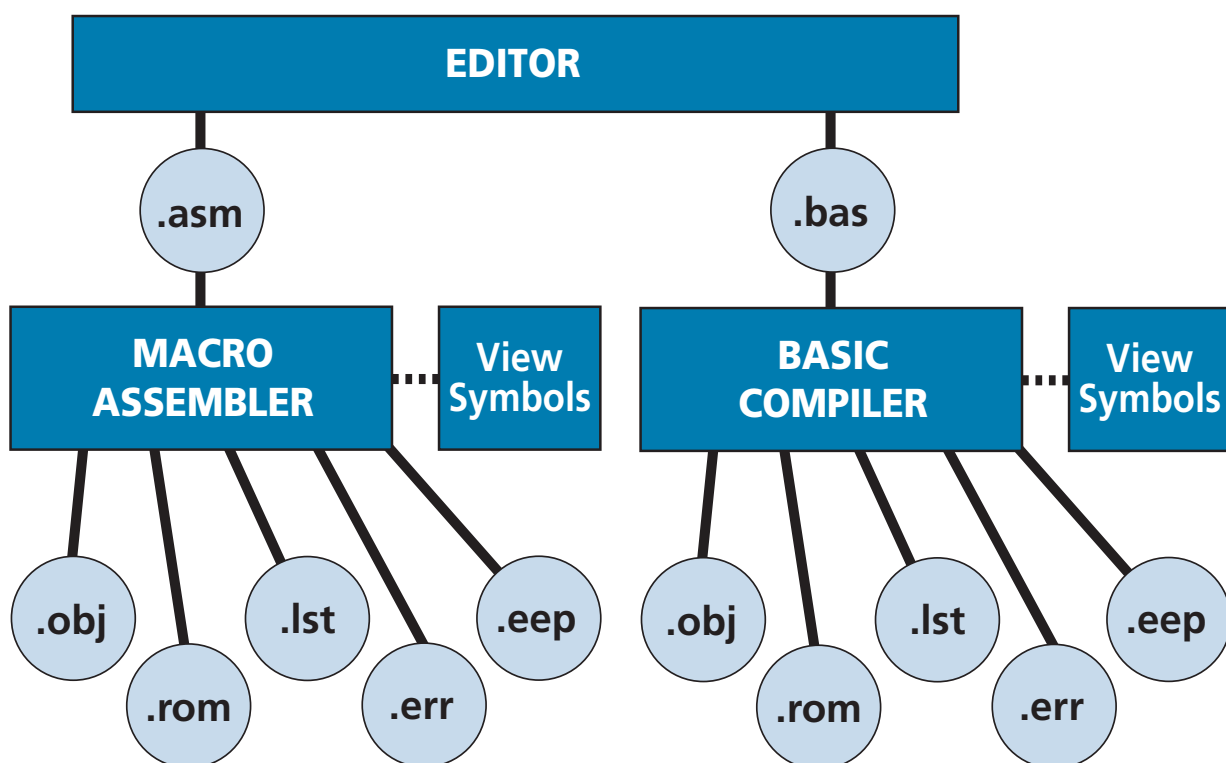
- | | |
|--|---|
| 1 Push Button Switches | 13 Port 2 |
| 2 Crystal | 14 40-pin Microcontroller Socket |
| 3 Configuration Jumpers for U4 | 15 ISP Programming Socket |
| 4 Reset Switch | 16 LED's x 8 |
| 5 20-pin Microcontroller Socket | 17 U2 Configuration (CON10) |
| 6 8-pin Microcontroller Socket | 18 Port 0 |
| 7 Configuration Jumper for Piezo Sounder | 19 Jumpers No: 1 & 2 |
| 8 Power LED | 20 Serial Communications (RS-232) Connector |
| 9 Program LED | 21 Piezo Sounder |
| 10 Power Supply Screw Terminals | 22 A/D Inputs |
| 11 Power Supply Input +9/+26v DC Unreg | 23 Jumpers 3 & 4 |
| 12 Jumpers No: 13 & 14 | |

Integrated Development Environment Overview

Getting started

The Integrated Development Environment (IDE) supplied with this system integrates the following tools:

- Text editor
- BASIC Compiler
- Macro Assembler



The AVR IDE is installed under the Windows Program Group 'Equinox'. To launch the IDE, simply double-click on the icon or from Windows 95 select:

<Start><Programs><Equinox> and then select the IDE.

i. AVR BASIC

The 'AVR BASIC Lite' compiler included with this system provides a powerful yet cost-effective method of developing high-level code for the AVR AT90S1200 microcontroller. This is a true compiler which takes BASIC source code and translates it into compact and efficient AVR assembler. Example basic source files can be found in the `.../avrbasic/` directory.

Integrated Development Environment Overview Continued

Opening an example BASIC project

Various examples are contained in \avrbasic\examples BASIC source files have the extension .bas, i.e. your .bas is your program!

The files in AVR™ BASIC for your project are:

your.asm : AVR assembler source file

your.bas : Basic source file

your.avd : Compiler settings*

your.err : Error file

your.lst : List file

your.obj : Object file

your.eep : File for EEPROM

your.rom : file for FLASH ROMi. avrasm

ii AVR Assembler

This macro assembler is a freeware product which has been integrated into the IDE. It is possible to write a file within the IDE editor and then compile it to produce executable code. Example assembly source files can be found in the .../avrbasic/asm directory.

Restrictions

Restricted to 1K bytes of code
AT90S1200 instruction set only

The following Atmel tools are also supplied with this system:

i. AVR Assembler - wavrasm

This assembler is written and freely distributed by Atmel the Atmel Corporation. This is a separate freeware application which is included for completeness. Equinox Technologies are not able to offer an technical support for this product. A user guide for this product plus other handy hints can be found on Atmel's web site.

AVR Assembler

This system allows you to author code in AVR assembler. There is a choice of two assemblers:

Technical Support

Due to the low cost nature of this product, no formal technical support can be offered.

Please consult the 'AVR BASIC Web Site' at www.avrbasic.com for further information or e-mail: avrbasic@equinox-tech.com.

* May not be implemented in early versions

AVR™ Support Products

Part code	Description
NEW MPW-PLUS	"Micro-Pro Device Programming System"
NEW UISP-S3-SYS	Micro-ISP Serial Programming System for the Atmel 89S/90S Microcontroller Families
NEW AVR2-ST	AVR Microcontroller Professional Starter System
NEW SS-90S8515-P	Atmel 90S8515 - AVR ISP Socket Stealer(DIL-40)
NEW SS-90S8515-J	Atmel 90S8515 - AVR ISP Socket Stealer (PLCC-44)
NEW EVALU8R-1P	Universal Microcontroller Evaluation Module
NEW AVR-BAS-LITE	AVR BASIC Lite (1K bytes code limit)
AD-PLCC44-A	Package adaptor - PLCC-44 to DIL-40 (for programming/package conversion)
AD-DIL40-PLCC44-A	Package adaptor - PLCC44 to DIL-40 (for emulation/package conversion)
AD-SOIC20-A	SOIC-20 to DIL-20 Adaptor Module
OEM-UC-20/40	"Generic microcontroller Single-chip OEM module (supports 20 & 40pin 87C, 89C, 89S, AVR, derivatives)"



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